‘The war whose bullets you don’t see’: Diamond digging, resilience and Ebola in Sierra Leone

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Abstract

This paper reflects critically on the transformational impacts the recent Ebola epidemic has had in diamond-rich areas of rural Sierra Leone. It focuses specifically on the country's 'diggers', a sizable group of labourers who occupy the bottom of the country's artisanal diamond mine production pyramid. Drawing on research conducted in the diamond-producing localities of Kenema and Kono, the paper argues how, in sharp contrast to the gloomy picture painted in the literature about their existences and struggles, diggers exhibited considerable resilience during the Ebola crisis. Their diversified livelihood portfolios proved to be effective survival strategies and buffers against the shocks and stresses brought about by lengthy periods of quarantine, and during times when mobility was restricted by the government in a bid to prevent the spreading of the disease. Drawing inspiration from the resilience literature, the paper captures the essence of these survival strategies, which should be viewed as latest reshuffling and expansion of diggers' rural livelihood portfolios. Policymakers and donors have yet to embrace fully these changes in a country where the Ebola recovery period promises to be lengthy and at a time when fresh, locally-informed rural development solutions are in short supply.

1. Introduction

A decade ago, Maconachie and Binns (2007) published a paper in the *Journal of Rural Studies* which highlighted the links between artisanal diamond mining and farming in rural Sierra Leone. Using both new and historical data, the paper drew attention to how tens of thousands of the country's rural families engage simultaneously in both activities, transferring finances and labour from one to the other, depending on the circumstances faced. Since its publication, a host of papers (see e.g. Hilson, 2011; Kamlongera, 2013; Perks, 2014) have emerged which report similar findings from elsewhere across sub-Saharan Africa. These studies confirm that, despite being overlooked almost entirely in the development studies literature in the 1980s and 1990s, the links between agriculture and artisanal and small-scale mining (ASM) – low-tech mineral extraction and processing – are deeply-rooted in all corners of sub-Saharan Africa, and that economically, the latter is the region's most important rural nonfarm activity.

This body of literature has provided a broad conceptual overview of ASM's place in sub-Saharan Africa, as well as demonstrated convincingly that for millions of the region's rural families, the sector is an integral segment of their fluid livelihoods portfolios, which 'adjust' and respond to changing circumstances. Whilst donors and host governments have accepted – at times, reluctantly – that there are linkages between ASM and farming, there continues to be a general underappreciation about the importance of the former, in particular how it buffers against shocks and stresses during times of hardship. This is a significant oversight in a country such as Sierra Leone, which has experienced its share of unparalleled disasters over the past three decades, most recently, an outbreak of Ebola. The epidemic, which gripped the Mano River region between 2014 and 2016, claimed 3956 lives in Sierra Leone; in total, there were 14,124 reported cases of infection in the country. It has also had a catastrophic economic impact in the country's rural areas, as government officials and donors, looking to prevent spread of the disease, restricted movements by implementing curfews, controlling the circulation of goods country-wide and quarantining local communities. The individuals who fall into the 'mining-farmer' and/or 'farming-miner' categories which Maconachie and Binns (2007) identified

a decade ago would once again turn to their complex and diverse livelihoods portfolios to cope with hardship, in this instance, the difficulties brought about by these changes. On this particular occasion, however, the reshuffling of economic activities induced by a crisis has broadened the livelihoods portfolios of many rural inhabitants by bringing to light other opportunities, as well as stimulated semi-permanent shifts in household income-earning strategies.

The purpose of this article is to examine in greater depth how, in Sierra Leone, rural families engaged in both ASM and agriculture coped during the Ebola crisis, and to highlight how their livelihoods portfolios have since changed. Throughout sub-Saharan Africa, donors and host governments have failed to keep pace with how the livelihoods portfolios of rural households engaged in ASM and farming have responded to, and cope with, shocks. Implementing policies that speak to the theme of 'resilience', which, because of the growing attention being paid in donor and NGO circles to adaptation to climate change, is now a major focus of development efforts in the region, could go a long way toward 'rethinking' and galvanizing support for ASM, a sector long overlooked in the region's rural poverty alleviation strategies. In the case of Sierra Leone, a country which ranks at the bottom of the UN's Human Development Index, scoring poorly on most social development indicators (Table 1), this is imperative. Here, a more nuanced understanding of how rural families buffer against shocks and stresses by simultaneously engaging in ASM and farming, and use their livelihoods portfolios as a platform to branch out into other income-earning activities, would yield more effective development strategies post-Ebola.

The paper begins with an extended analysis of rural livelihoods diversification in sub-Saharan Africa, with special emphasis on the – often-overlooked – role played by ASM. In particular, the discussion emphasizes how 'resilience' has been an important concept for understanding how households adapt to shocks and stress in rural stretches of the region where ASM features prominently in livelihoods portfolios. The section that follows details the struggles and experiences of Sierra Leone's 'diggers', the main focus of this paper. This sizable group of labourers occupy the bottom of the country's artisanal diamond mine production pyramid, and have long been portrayed in the literature as 'marginalized' and exploited by middlemen. But as the penultimate section of the paper illustrates, drawing upon research conducted in the diamond-producing localities of Kenema and Kono in the period immediately after Sierra Leone was declared 'Ebola free', in sharp contrast to the gloomy picture painted by the literature about their existences and struggles, diggers exhibited considerable resilience during the crisis. The coping mechanisms that are often characteristic of diversified livelihoods portfolios proved to be an effective survival strategy for these diggers; many also succeeded in using their diversified portfolios as a platform to 'branch out' into other economic activities during times of crisis. The paper concludes by revisiting how a 'resilience'-focused approach helps to illuminate many overlooked nuances in rural sub-Saharan Africa. It is against this background that it calls on the Government of Sierra Leone and donors to 'rethink' their approaches to alleviating rural poverty in the country, with a view to implementing policies and programs that are more in tune with the dynamics of what is a very different landscape, post-Ebola.

Table 1: Selected Human Development Indicators for Sierra Leone

	Sierra Leone	Sub-Saharan Africa	World
HDI (2014)	0.413	0.518	0.711
Life Expectancy at Birth (years) (2014)	50.9	58.5	71.5
Infant Mortality Rate (per 1000 live births)	107.2	60.8	33.6
Expected years of schooling (2014)	8.6	9.6	12.2
Mean Years of Schooling (2014)	3.1	5.2	7.9
Adult Literacy Rate (% aged 15+) (2013)	44.5	58.4	81.2
GNI per capita PPP$ (2014)	1780	3363	14301
Employment to Population Ratio (% aged 15+) (2013)	65.2	65.7	59.7
Inequality-adjusted HDI (IHDI) (2014)	0.241	0.345	0.548
Gender Development Index (GDI) (2014)	0.814	0.872	0.924
Multidimensional Poverty Index (MPI) (2013)	0.411	N/A	N/A

Sources: UNDP, 2016; table adapted from Bateman, 2017

2. Livelihood Diversification, ASM and Resilience in Rural Sub-Saharan Africa

Since the late-1980s, analysis of livelihoods diversification in poor African communities has become increasingly important in international development circles. Initially, such analysis provided a foundation for understanding how the region's rural subsistence populations responded to a host of economic, social and regulatory changes made under structural adjustment, and in the process, became more 'resilient' – the underlying theme of this paper. However, a growing literature now suggests that livelihoods diversification has long been a hallmark of the region's rural populations, manifesting itself differently depending on the circumstances (Carswell, 2002). This body of evidence provides a timely reminder of how millions of the region's rural families have drawn upon 'built-in' resilience mechanisms within their livelihoods portfolios for generations. Individuals and households often possess different combinations of 'capital assets' in their livelihoods portfolios; at any given time and depending on the circumstances, they may convert one category of assets to another (Stocking and Murnaghan 2001). Perhaps more significantly, the body of literature on diversification, although disparate, offers a glimpse of how diverse and embedded the livelihoods portfolios of the region's rural inhabitants truly are, in the process, providing a template for developing more robust poverty-alleviation strategies.

By the late 1990s, analysis of livelihoods diversification had been fully mainstreamed into the UK Department for International Development's (DFID) Sustainable Livelihoods Approach (SLA) and variations of it, which had taken centre stage in the poverty alleviation strategies being implemented by donors (Singh and Gilman, 1999; Scoones, 1998; Gilling et al., 2001; Ellis and Biggs, 2001; Allison and Ellis, 2001). Although not particularly comprehensive theoretically, the SLA was instrumental in drawing attention to the struggles endured by neglected subsistence groups. As Carney (1999a) reported, Sustainable Livelihoods thinking, which 'centred on people and their livelihoods', had 'informed discussions with partners at all scales, from the international to the very local', and in the process 'provided new insights into the livelihoods of the poor and emphasised the importance of

working alongside poor people and supporting them in reducing poverty' (p. 7). It specifically revolved around the theme of vulnerability, which, as Rakodi (1999) explained at the time of its conception, 'related to insecurity, sensitivity of well-being in the face of a changing environment, and households' resilience and ability to respond to risks and negative changes (economic, environmental, social or political, including shocks, trends and seasonal cycles) and to opportunities' (p. 316). In short, as noted by Carney (1999b), livelihoods approaches 'have learnt from participatory assessments that vulnerability is a core dimension of poverty' and have prioritized 'reducing vulnerability' or 'helping people to develop resilience to external shocks and increase the overall sustainability of their livelihoods' (p. 3). This 'thinking' resonates powerfully with the experiences of Sierra Leone's diamond diggers, specifically how they have responded to the shocks and stresses induced by Ebola.

This body of conceptual work must also be credited with sparking in-depth investigation that has sought to determine *why*, in sub-Saharan Africa, the inhabitants of rural communities choose to diversify their income portfolios. Initial discussion focused on the issue of seasonality (see e.g. Haggblade et al., 1989; Reardon and Vosti, 1995; Reardon and Taylor, 1996; Reardon, 1997; Ellis, 2000; Barrett et al., 2001; Lay et al., 2009), drawing attention to how, during the non-growing season, rural households pursue employment in the nonfarm economy; the incomes earned here support agriculture; and labour and finances flow continuously between the two activities, and are, therefore, to some extent, inseparable. More recently, ASM has become a focal point of this discussion (Banchirigah and Hilson, 2010; Hilson, 2011; Hilson, 2016; Maconachie and Binns, 2007, Maconachie, 2011), with scholarship highlighting how, for numerous farm-dependent families in sub-Saharan Africa, artisanal mining is now the primary income-earning activity and relied upon significantly to support agriculture.

Seasonality continues to feature prominently in this body of literature. But subsequent analysis has since reflected more critically on the circumstances driving subsistence families to rely more heavily on nonfarm activities. At the most basic level, the underlying motivations for diversification can be rationalized as *choice* on the one extreme, and *necessity* or *survival* on the other extreme (Ellis, 2000). Of particular relevance in the case of artisanal diamond mining in Sierra Leone, however, is the latter, which now finds itself at the heart of debates on livelihoods resilience and is commonly cited by scholars (e.g. Davis and Bezemer, n.d.) as an example of 'distress-push' diversification. Analysis of 'distress-push' diversification has articulated quite clearly how subsistence farm-dependent households in sub-Saharan Africa have responded to extreme shocks and stresses. This is supported by abundant evidence of the agricultural and ASM sectors 'dovetailing' one another throughout sub-Saharan Africa (Banchirigah and Hilson, 2010; Kamlongera, 2011), including in Sierra Leone (see Maconachie and Binns, 2007). The individuals engaged in these activities 'straddle' both throughout the course of their lives, continuously striking a balance between the two. For many of the region's poverty-stricken groups, doing so is the key to their survival, particularly when suddenly confronted with difficult circumstances.

A significant advancement of the livelihoods diversification literature has been its ability to contextualize and explain the movement of subsistence farm-dependent groups into ASM across sub-Saharan Africa. The literature on livelihoods resilience provides valuable nuance on this front, helping to fortify a dialogue on farming and ASM which, at least in the case of sub-Saharan Africa, has stagnated in recent years. The growing fanfare around the concept of resilience in international development circles stems from it increasingly featuring as a focal point, thematically, in research on rural livelihoods and climate change adaptation (Tanner et al., 2015). Comprehensive reviews (e.g. Walker et al., 2006; Nelson et al., 2007; Adger et al., 2011; Brown and Westway, 2011; Dixon and Stringer, 2015) trace the antecedents of the idea to the ecology research of the 1960s and 1970s,

specifically work which explored the structures and functions of ecological systems. This body of analysis has provided a foundation for contemporary scholarship on social resilience, research which, in the context of climate change and rural livelihoods, examines 'the ability of a community to withstand external shocks and stresses without significant upheaval' (Adger et al., 2002, p. 358). While the concept of social resilience is often used to describe social systems that are able to absorb and utilize change, including resistance to shocks, it has also gained traction in livelihoods analysis. Here, the resilience of households may be directly related to how they manage the financial resources available to them, and particularly with respect to how they deal with shortages of capital assets in times of uncertainty (after Stocking and Murnaghan, 2001).

Complementing the literature on 'distress-push' diversification, livelihoods resilience is most commonly used as a 'lens' to explore how subsistence communities respond to extreme events, such as floods, famine or drought (see e.g. Fraser, 2006; Blythe et al., 2014; Shiferaw et al., 2014). Investigations focus on how people cope with and/or plan, or the stresses and shocks induced by these occurrences. Adger et al. (2002) offer a detailed explanation:

> Social resilience is the ability of a community to withstand external shocks and stresses without significant upheaval…resilience at this level can be conceived as made up of, or shaped by, the dynamic structures of livelihoods, access to resources, and social institutions. External shocks and stresses, including changes in government policy, civil strife, or environmental hazards, exert pressures on social structures, livelihoods, and resources.…When communities are resilient – with a resilient and accessible resource base and a dynamic range of viable livelihoods and responsive institutions – they may be able to absorb these shocks, and even respond positively to them. However, when communities are less resilient – perhaps because their resource base is fragile or inaccessible, their set of livelihoods are insecure, or their community institutions are rigid – or when external changes are rapid and far reaching, significant upheaval may occur. [p. 358]

Drawing on findings from fieldwork undertaken in 2016, the discussion that follows examines how the Ebola epidemic impacted the livelihoods of subsistence populations engaged in alluvial diamond mining in rural Sierra Leone. The study draws inspiration from the literature on livelihoods resilience, which, as mentioned, is fast gaining traction as a theme in the field of international development. It adds nuance to scholarly debates on livelihoods diversification in rural sub-Saharan Africa, and by extension, the case study examined here. In doing so, it adopts a dynamic view of 'resilience', which, as Arnall (2015) explains, requires 'demonstration of not just how adaptations to external shocks and stresses might occur in the presence of wider structural forces, but also how those structures themselves might come to be challenged as part of this process' (p. 27). The remainder of this paper focuses on the case study of Sierra Leone's diamond diggers.

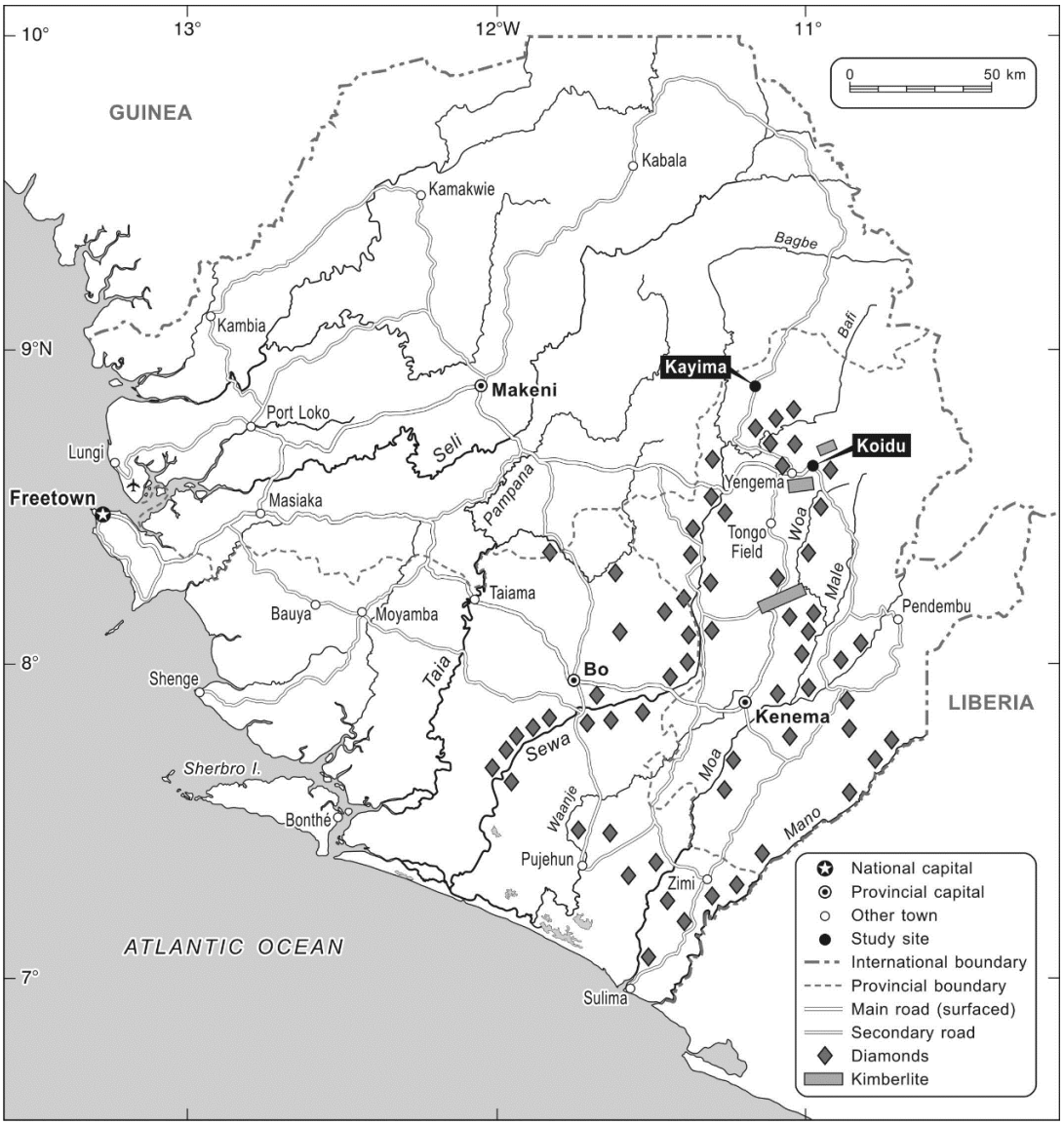
3. Sierra Leone's Diamond 'Diggers': Experiences and Struggles

Alluvial diamonds were first discovered in Sierra Leone in 1930, in the Gbobora stream in Kono District in the Eastern Province. Further geological exploration confirmed that viable diamond deposits were in abundance in other areas of Kono District and Kenema District, particularly within the drainage basins of the Bafi, Sewa, Woa, Mano and Moa Rivers (see Figure 1). Here, alluvial diamonds are widely scattered in riverine deposits, in locations where local populations are living and working. They are commonly extracted 'artisanally' by small groups of individuals armed with rudimentary implements such as picks, shovels, buckets and sieves.

Van der Laan (1965) was one of the first scholars to focus in detail on these diggers' livelihoods. As explained by the author, artisanal diamond digging commenced in Kono in 1952, initially by individuals

who had observed and acquired information from the prospectors working for the Sierra Leone Selection Trust (SLST), the resident corporate entity with mining rights. Once word reached neighbouring villages, masses of people flocked to Kono District and other diamond-bearing areas of the country. Unable to curb the rapid escalation of illegal activity, the government had little choice but to ask the SLST management to relinquish a portion of its concession to allow diggers to work under the company's license. The *Diamond Mining Ordinance* (1956) and *Alluvial Diamond Mining Rules* (1956) provided the legal framework for this move, and empowered the Mines Department to collect fees from, and demarcate claims and issue licenses to, diggers. These two pieces of legislation, along with prospecting rules subsequently introduced in 1957, sought to empower indigenous or 'native' firms. But they would rather create environments in which the diamond buyer-digger relationships that have received so much attention in the literature over the years would galvanize and provide further support to the associated patronage networks which have become fortified and entrenched.

Figure 1: Diamondiferous Regions of Sierra Leone



It has become almost routine to describe Sierra Leone's diamond diggers as 'exploited' and 'marginalized'. Diggers must 'endure particularly dangerous conditions, and many live on less than a dollar a day' (Maconachie, 2008, p. 9). Many more, despite having 'spent years working as diamond diggers' have, in fact, 'seen very little in the way of any earnings' (Maconachie, 2011, p. 1061). A wave of NGOs, including Global Witness and Partnership Africa Canada, have communicated these details through a series of publications to the general public (Smillie et al., 2000; Global Witness, 2005). Of particular concern has been how diggers often find themselves trapped at the bottom of the country's diamond supply chain, their efforts to accumulate wealth stifled by an oligopoly in which profit-making is concentrated at higher levels:

> The production and marketing hierarchy runs downwards from exporters, to dealers and to diggers. Dealers engage gangs of diggers to dig for diamonds based on a supporter-tributor relationship rather than wage contract. Financial constraints, lack of external marketing contacts, and a Lebanese cartel prevent most Sierra Leoneans from becoming exporters and dealers who collect virtually all the rents. They end up mostly as diggers practically indentured to their supporter who provides them food and mining equipment, and pays land use fees. [Davies, 2002, p. 8]

In addition, chiefs, who are recognized as the guardians of customary land rights in Sierra Leonean society, have long played a brokerage role in the alluvial diamond mining sector, serving as middlemen between Lebanese, Fula as well as Mandingo supporters seeking access to mining plots, and local land owners holding mining claims. As van der Laan (1965) explains, many were empowered at an early stage of the legalization exercise by the Mines Department. Officials relied on their recommendations before granting claims to applicants, and in exchange, permitted them to extract payment in the form of a surface rent, a strategy which is widely believed to have expedited the legalization of diamond rushes in West Kenema and Bo District. But in addition to working in collaboration with Mines Department officials, chiefs would use their new-found positions of influence to wield even greater control over alluvial diamond production. Quickly recognizing that diggers' payments exceeded those of the SLST, which were mostly routed to central government, many chiefs focused solely on accumulating personal wealth by maximizing Chiefdom revenues (Greenhalgh, 1985). This rent-seeking behaviour, Rosen (1973) explains, would encourage in-migration from wealthy, government-connected 'strangers', who paid chiefs significant sums of money to gain access to the local diamond economy (see also Fithen, 1999; Reno, 1995) in exchange for political support (Greenhalgh, 1985).

Diggers, therefore, have long been squeezed by both chiefs and supporters (see Zack-Williams, 1995, for a comprehensive account of these dynamics). They continued to be heavily exploited throughout Sierra Leone's protracted civil war (1991-2002). Revolutionary United Front (RUF) forces infiltrated Kono in October 1992, largely because government soldiers were busily digging for diamonds as opposed to defending the District (Silberfein, 2004). As Shaw (2003) explains, after seizing control of the locality's diamond fields, local RUF commanders ruthlessly demanded that all stones collected by diggers be turned over; failure to do so resulted in severe physical punishment, including, at times, execution. If civilian miners were mandated to work for RUF commanders either a certain number of days weekly or hand over a stated percentage of gravel as Peters (2011) suggests, then the conditions facing diggers were far more exploitative than before and after the war.

Decades of exploitation, including particularly difficult conditions during the war, have pushed Sierra Leone's diamond diggers into perpetual survival mode, which has helped them adjust to the changes brought about by, and cope with, the recent Ebola epidemic and its aftershocks. Specifically, and as will be explored in the next section of the paper, diggers' built-in resilience within their livelihoods portfolios have helped to buffer against the shocks and stresses induced by the disease. The most widely-discussed activity which features in this portfolio is farming, which, as noted, has long

'dovetailed' alluvial diamond mining, carried out seasonally (Maconachie, 2012; Maconachie and Binns, 2007, Binns, 1981; 1982). Pre-Ebola, many diggers could be seen developing farm lands alongside their mining activities, working 'after searching for diamonds until 1 or 3 o'clock in the afternoon' (Pijpers, 2011, p. 1070). The paper now turns to examining how the ability to 'branch out' into agriculture and other economic activities fortified resilience in rural communities during Ebola. Despite having long been heavily marginalized and exploited by sponsors and chiefs, Sierra Leone's diamond diggers were surprisingly well-equipped to cope with the shocks and stresses brought about by the epidemic, mostly because of their ability to readily diversify into other areas with very little consequence.

4. Ebola and Sierra Leone

In early June 2016, just three months after Sierra Leone had been declared 'Ebola free' by the World Health Organization, pilot research was undertaken by the authors in Kono and Kenema Districts, to gain a preliminary understanding of how the crisis had impacted artisanal diamond mining supply chains. An attempt was also made to determine how key actors in the country's artisanal diamond mining sector were impacted by Ebola, and how they were subsequently adapting their livelihoods portfolios in response. Although three months had passed since the end of the crisis, and respondents were not threatened by the disease at the time of interviewing, the period of turmoil was still very fresh in their minds, as were the strategies they used to survive.

This initial pilot work was followed by two separate fieldwork trips to Sierra Leone, also in 2016. In order to capture a broad range of perspectives, fieldwork was confined to Kono and Kenema Districts, the country's main diamond bearing regions. Research took place in a series of diamond mining communities where the authors have worked for many years, and where strong rapport had already been established with a diverse range of stakeholders.

Qualitative data were generated using a suite of methods derived from the Rapid Rural Appraisal family (Chambers, 1992), including transect walks, semi-structured interviews, focus group discussions, and life histories with miners. In total, 30 key informant interviews were carried out with a wide range of actors, including diggers, supporters, traders and middlemen, Chiefs, elders, and a number of government officials involved in policy formulation. A purposive sampling frame was most suitable for this study, since the objective was to gain insight from a select population based on unique characteristics. Although purposive sampling has been criticised on the grounds that it can be prone to researcher bias, the target population in this case was relatively homogenous, and selection was based on clear criteria (Ebola survivors in mining areas who had some connection to the artisanal diamond mining sector). The sample size was not fixed prior to the commencement of the fieldwork, but was rather dependent on the availability of the target population at the time the study was carried out.

Informal visits were also made to mining sites, and a total of 12 semi-structured interviews were carried out with diggers and pit managers. This was complemented by five focus group discussions with individuals who were active in the diamond sector, including members of Chiefdom Mining Committees, and those buying and trading diamonds. Both interviews and focus groups lasted approximately 45-60 minutes each. Discussions were carried out in the local Kono language, or in *Krio*, the lingua franca of Sierra Leone, and were recorded on a dictaphone. The audio transcripts were translated by a research assistant verbatim into English.

Drawing upon this research, this section of the paper attempts to make sense of how Sierra Leone's artisanal diamond diggers were able to cope with and respond to the extreme stress during the crisis, at a time when many other rural actors were vulnerable and not able to exhibit such resilience. Before

doing so, a brief overview of existing literature on Ebola is provided to contextualize the conditions that diggers faced, and to locate the paper in a growing body of work on the crisis.

4.1 The Ebola Epidemic in Sierra Leone: Contextualizing the 'Shock'

The microeconomic changes induced by, and responses of households to, the Ebola crisis in West Africa have received superficial treatment in the literature thus far, but the epidemic itself has been examined in considerable depth. A host of studies published over the past three years provide detailed insight into the chaos it created and the measures taken by the region's governments to prevent the disease from spreading, and ultimately, a glimpse of the changed conditions vulnerable subsistence groups were forced to adapt to. The outbreak in West Africa, which was first reported in March 2014, would become the deadliest case of the disease since its discovery in 1976: by early-2016, it would claim the lives of more than 11,000 people and infect over 28,000 others in West Africa, and place considerable strain on already-precarious health and social systems (Cangul et al., 2017). In Sierra Leone, the first case was reported on 25 May 2014 in Kenema, by which time the government had already established an enhanced surveillance program in the town's hospital. It was only one month later that the government would declare a state of emergency, and within six months of the first reported case, the outbreak had peaked, with up to 150 reported cases of infection per week (Piot et al., 2017). The macroeconomic impacts of the epidemic fell into sharp focus, when London Mining, the country's second largest iron ore producer, suspended its operations in October 2014 (see Allouche, 2015). According to the World Bank (2015), only one year after the onset of Ebola, the estimated GDP loss for Sierra Leone, which was still recovering, financially, from its decade-long civil war, was an estimated US$1.4 billion (also see Table 2).

Table 2: Selected Incidence and Impact Indicators of the Ebola Crisis in Sierra Leone

Impact on Growth and Household Poverty	
Proportion of population infected in the economically active age group (%)	70
Job loss in the private sector (%)	50
Job loss in the manufacturing sector (%)	60
GDP growth rate in 2012/13 (%)	15.2/20.1
GDP growth rate in 2014 (estimated)	6
Revenue loss since outbreak of disease (Leones)	Le350 billion
Revenue loss since outbreak of disease (US dollars)	US$74 million
Poverty headcount prior to outbreak (%)	52
Proportion of agricultural activities disrupted by the disease (%)	47
Decline in agricultural output due to disease (%)	30
Total number of farm families	420,000
Number of farm families with worsened livelihoods due to the disease	197,400
Number of non-farm household heads with worsened livelihoods due to the disease	179,000
Estimated population with worsened livelihoods due to the disease	2,258,400

Source: Sector Working Groups on Ebola Recovery. Table adapted from GoSL (2015)

Overall, the burgeoning body of literature on the Ebola crisis in West Africa offers sparingly little insight on its economic impact at the local level, particularly in rural areas. The initial wave of publications on the subject focused heavily on the international response to the crisis (e.g. Awlward

et al., 2014; Chan, 2014; Lewis et al., 2015); shared details about the conditions of healthcare facilities in affected countries, including accounts of nurses and doctors working in treatment clinics (Pathmanathan et al., 2014; Boozary et al., 2014; Greenberg et al., 2015; Wilson, 2015); and reported findings from efforts to model the spread of the disease (Meltzer et al., 2014; Rachah et al., 2015). More recent analysis has weighed in retrospectively on the spread of the disease (e.g. Ross, 2017; Wilkinson and Fairhead, 2017) and the actions taken by donors and Western governments to contain it (e.g. Dye et al., 2016; Cori et al., 2017; Lamb et al., 2017). Other scholars (e.g. Arima and Shimada, 2015; Awah et al., 2015; Boulton, 2015) seemed determined to re-acquaint the scientific community with the dynamics of a disease which experienced its worst outbreak in over 40 years.

In their recent edited book, Abdullah and Rashid (2017) explore the history and political economy of the crisis, bringing together a series of contributions that expose the structural roots and underlying factors that exacerbated the epidemic. Other ethnographically-informed analyses have engaged with the ideas of resistance and complicity, demonstrating how the two are complexly intertwined, and shaped by notions of crisis and normality (see Enria, 2017; Lipton, 2017). Likewise, Fairhead (2016), focusing on the forested region of Guinea, has emphasised the degree of social resistance to outbreak control measures which took hold, while Richards (2016) has focused on the humanitarian response and how local people adapted socially and culturally to fight the disease. But whilst highly selective in focus, and informative in its own right, all of this work provides little detail on rural families' economic responses to the epidemic, as well as how livelihoods portfolios adjusted to the crisis.

The existing body of literature on Ebola in West Africa does, however, offer glimpses of the conditions endured by local populations. It paints a picture of chaos and a medical and social system which had become 'hollowed out', and, even with the infusion of foreign personnel, finance and technology, was ill-equipped to contain the disease. Many of these accounts were reinforced by individuals interviewed for this research, who offered vivid descriptions of the chaos and confusion that had gripped Sierra Leone's diamond mining localities at the time, each very similar to the details of reports on the spread of the epidemic found in the general literature on Ebola:

> After my discharge, I used to talk to my wife as we both had phone. I arrived at Bumpeh on 7th [January]. Since then my wife and I were in communication. On 10th January, 2015 I was called on the phone and told that she was dead.[1]
>
> Slowly, the diseases infiltrated in to Kenema, Bo and then Freetown. During these periods, we also heard the steady rise in the fatality. It then took a Northern turn in to Portloko district, Makeni in Bombali district and then Magburaka in Tonkolili district which borders with our own district.[2]
>
> There were ambulances all over the place and we were scared. In some houses, 80 people could be affected and 20 of the affected 80 will die.[3]

As was insinuated in the previous section of the paper, it is likely that Sierra Leone's protracted period of civil violence helped to fortify diggers' resilience, creating a hardiness which played a role in preparing them for the shocks and stresses induced by Ebola. Whilst some commentators (most recently, Winter, 2017) have both implicitly and explicitly drawn parallels between the magnitude of the shock induced by the war on the one hand, and Ebola on the other hand, it quickly became

[1] Interview, Ebola survivor, Bumpeh, July 4th 2016.
[2] Interview, Section Chief, Bumpeh, July 4th 2016.
[3] Interview, Chairman of Kono Diamond Dealers Association, Koidu, July 5th 2016.

apparent during the course of interviewing that the epidemic was unlike any crisis the country's population had seen before. As one interviewee put it, whilst the former 'was a war whose bullets you don't see but it was heavy for us', the latter 'was not like the Revolutionary United Front rebels from whom you can run away [because] Ebola is an invisible disease; we can't tell who has it'.[4]

In the country's diamond-producing localities, the initial response of residents to the warnings and 'instructions' issued by the authorities about Ebola could best be described as ambivalent. The complacency and at times, outright non-responsiveness, of communities – even after the first cases had been reported and the disease had taken on a 'visible' dimension – was attributable to a distrust in government, shaped by decades of broken promises and the consequent reality of their day-to-day hardships. Some of the specific reasons for this denial given during interviews, each reinforcing claims of government distrust, included 'political gimmicks'; how 'some people didn't believe that Ebola actually existed'; how people 'never believed that the disease was real' because 'the far east of Sierra Leone from where the disease entered the country is the stronghold of the main opposition party, the Sierra Leone Peoples Party [and] they thought it was some form of government manipulation to reduce the population in the opposition stronghold';[5] that 'Ebola was man-made and people shouldn't believe in it'; and that 'it was America that brought it to reduce our population'.[6]

Those who chose to ignore the government's calls to remain at home and not to travel sizable distances were chiefly responsible for expediting Ebola's rapid spread across West Africa. Everyone interviewed seemed to have their own stories – which at times overlapped – about how the disease actually entered Sierra Leone's diamond-producing areas:

> A little girl brought Ebola in Kono from Makeni where she contracted the diseases from a quarantine home from which she escaped. She came to Kono to her father for medication but she ended dying together with her mother and all that contacted her.[7]
>
> We were told that it was brought in to Kailahun by a woman…Slowly, the disease infiltrated into Kenema, Bo and then Freetown…It then took a Northern turn to Portloko District, Makeni in Bombali District and then to Magburaka in Tonkolili District which borders with our own district. Here is the start of our own Ebola story in Kono. There was a driver here named Mr. Mansaray...He was a professional driver and owned a vehicle by himself that he drove as taxi. One day, he picked up a female passenger from Jesus Town. The woman was sick and he was taking her to the Government Hospital. On the way, the woman threw up on him but he endured and took her to the hospital. Subsequently, the woman died after the third day. Meanwhile, the registration number of the car that took the woman to the hospital was recorded in the hospital...The driver was known to be a nice man but he later behaved irresponsibly. When he returned from dropping off the sick woman at the hospital, he removed the registration number from the car and put a different one on. The woman later died of the disease. The Ebola response team was all over the local news announcing the registration number of the car that conveyed the late woman to the hospital and that she had Ebola, but they couldn't identify the car. We all heard the announcement but we were not able to discern

[4] Interview, Chairman of Kono Diamond Dealers Association, Koidu, July 5th 2016.
[5] Interview, Section Chief, Bumpeh, July 4th 2016.
[6] Interview, Chairman of Kono Diamond Dealers Association, Koidu, July 5th 2016; Interview, Section Chief, Bumpeh, July 4th 2016.
[7] Interview, supporter and artisanal diamond mining license holder, Koidu, July 6th 2016.

> that it was Mansaray's car registration number that was being announced. As the search continued for this missing driver, Mansaray started feeling sick…[8]

> I was born in Njiama Nimikoro and I grew up as a miner. The first Ebola fatality in this town was on the 13th December, 2014. The deceased was buried on 14th December 2014. The house of the deceased was quarantined on 18th December, 2014. I went to visit him when he was sick and even entered in his room. When he died, I attended his funeral too. The late man was a driver and he contacted the disease from a passenger that boarded his vehicle from Jesus Town to Koidu. After his death, it was his car that we used to get to Koidu to buy food items used to feed the people that attended the funeral.[9]

Anecdotes such as these add valuable contextual understanding to the series of modelling exercises carried out since mid-2015 (e.g. Peckham and Sinha, 2017; Pettey et al., 2017), which have mostly used mortality and other medical data to map the distribution of the disease but offer minimal explanation for why it spread the way it did.

For diggers, it was the shocks linked to the resulting quarantining which proved most impactful and therefore required the greatest response and adjustment to. The first category of shocks can be described as 'social', specifically, the changes in behaviour groups such as diggers were forced to make: the government and international agencies were unable to control mobility but once people realized that human contact was responsible for the spreading of the disease, they seemed to accept that their movement needed to be minimized. Reflecting generally on the situation at the time, one interviewee explained that 'All body contact was forbidden, there was ban on all secret societies [and] making love was also minimized'.[10] For diggers, restricted mobility in an industry – alluvial diamond mining – in which success hinges so much upon the free movement of labour and finance proved crippling. It began with their source of transport, the motorbike taxis known as *okadas*, which 'were not allowed to ride after 6:00 PM'.[11]

Perhaps what required the most adjustment for diggers both physically and mentally, however, was accepting that working together was no longer an option because of the possibility of contracting the disease. It was, as one interviewee explained, 'forbidden to even greet people, you couldn't touch anyone', which was a concern for diggers because 'If somebody is infected and goes to the mines, when working, the sweat from their body may be a possible source of spread of the disease'.[12] Group solidarity has long been a defining feature of Sierra Leone's diamond digging community, and in the past, likely an important buffer against the shocks and stresses which surfaced during times of immense hardship. One interviewee captured the essence of the scale of adjustment required:

> When the Ebola was at its highest peak, people didn't greet each other; they didn't go to mosque or church. If you don't go to these places with your colleagues, how do you think you can go with them to the mines? The rules were really strange. Some people were putting on long sleeve shirts. To learn a new habit is very difficult, you can improve on the old ones. It was very difficult for our people to adjust to these by-laws.[13]

[8] Interview, Section Chief, Bumpeh, July 4th 2016.
[9] Interview, Ebola survivor, Bumpeh, July 4th 2016.
[10] Interview, Section Chief, Bumpeh, July 4th 2016.
[11] Interview, Chairman of Kono Diamond Dealers Association, Koidu, July 5th 2016.
[12] Interview, Chairman of Kono Diamond Dealers Association, Koidu, July 5th 2016.
[13] Interview, Chairman of Kono Diamond Dealers Association, Koidu, July 5th 2016.

In a chaotic environment where 'neighbours were afraid of getting closer to us hence they shared nothing with us',[14] 'there were no friendships, we didn't talk to one another, and we didn't sit as we are doing now',[15] and 'Till now, hand shaking remains scary',[16] diggers were forced to make significant adjustments, including reluctantly dissolving work relationships in order to ensure the safety and wellbeing of their families.

The second category of shocks was 'economic', also brought about by restrictions on movement during quarantining. In the tightly-knit diggers community, during times of hardship, most turn to work colleagues for assistance. But during Ebola, for the few individuals who were in possession of finances, extending economic support would prove crippling. The following passages from selected interviews illustrate this:

> Three of my workers were among the team that took her [a dead woman] for burial and they contacted the disease too. I spent plenty money on them hoping that they will be cured but they died. This was how I lost all my money. I stopped mining and all other economic activities for a year, taking care of my kids. I survived only from the money I collected from my rent[ing] in Freetown [of my house].[17]

> In our 'family' setup, those that do not have money will always look up to those with some money. People are always at my door asking for help. I can't do everything for them but they will always appreciate the little I offer to do.[18]

The broad consensus among all individuals interviewed was that the quality of life during the crisis was extremely poor, with claims that people subsisted on bananas and bush yam, and of how, some families lived on less than 5000 leones (less than 1 US dollar) daily.[19]

Restricted mobility affected the timely delivery of staple foodstuffs to remote diamond-producing areas such as Kono and Kenema. The price of rice, so crucial to the 'payment' of mine labour, had increased from 1000 leones to 1500 leones, which meant that sponsoring a group of diggers to work became expensive. There was also the challenge of securing steady supplies of the petrol needed to power pumps and other equipment. But even when available, it was extremely costly, forcing sponsors to abandon diamond mining altogether.[20]

As indicated in the previous section, patronage networks and finance capital supplied by elite actors have long played an important role in the tributor-supporter system that defines the diamond mining sector in Sierra Leone. Whilst it was clear that diggers suffered immeasurably during the crisis, buyers, dealers and the extensive support network of actors who support diamond transactions, both in Sierra Leone and internationally, were also adversely affected. Interviews with supporters and exporters shed further light on the disastrous impact that the crisis had on patrons and their ability to support diamond production. One interviewee was particularly vocal about the issue:

> The system here is that we buy the fish before it is caught. We help them [the diggers] to get the diamonds. They will not be able to get the diamonds to us, if we don't help them…During

[14] Interview, Ebola survivor, Bumpeh, July 4th 2016.
[15] Interview, Section Chief, Bumpeh, July 4th 2016.
[16] Interview, Paramount Chief's Speaker, Nimikoro Chiefdom, July 6th 2016.
[17] Interview, supporter and artisanal diamond mining license holder, Koidu, July 6th 2016.
[18] Interview, supporter and artisanal diamond mining license holder, Koidu, July 6th 2016.
[19] Interview, Paramount Chief's Speaker, Nimikoro Chiefdom, July 6th 2016.
[20] Interview, supporter and artisanal diamond mining license holder, Ngaiya, July 6th, 2016.

> Ebola, most people here had no money and nothing to eat, not even rice. And mining needs some money to buy tools like sieves and shovels. These are cheap, but the diggers don't have them. For this reason, most supporters left mining and became commission seekers sitting outside diamond offices, waiting to follow miners that brought in their diamonds for sale, so that they could have some commission.[21]

The resulting 'squeeze' on patronage resources and the subsequent decline in diamond production forced diggers to think 'outside of the box' in their search for alternative sources of livelihood. As will be explained in the discussion that follows, diggers would, indeed, draw heavily on their livelihoods portfolios to build resilience during a period of immense uncertainty, but opted to pursue activities which did not compromise the welfare of their families. Most, therefore, chose to work in sectors which afforded them the requisite isolation from others and the option to work individually, despite being an entirely new experience.

4.2 Farming: A Seamless Re-Entry?

Once the patronage networks propelling alluvial diamond mine production began exhibiting signs of deterioration, diggers had little choice but to actively pursue alternative income-earning activities. In the immediate term, however, agriculture would prove to be the most appealing, largely for three reasons, the first being that it has long been the centrepiece of most diggers' livelihood portfolios. During times of extreme crisis, such as the period marked by Ebola, therefore, shifting from diamond mining back into farming was relatively seamless for most.

In fact, the survival of grassroots-level actors in diamondiferous localities such as Kono District has long been determined by their ability to engage simultaneously in, and strike a balance between, agriculture and mining. Binns (1981) was one of the first scholars to draw attention to this phenomenon, reflecting on observations made and research undertaken in the Eastern Province of the country in the 1970s. Here, in communities located close to major diamond-producing areas, a regular circulation of labour was observed between mining and farming, the former mostly taking place during the dry season and the latter, the rainy season. Sierra Leone's farmers have long 'straddled' several productive activities over the course of the calendar year, participating in mining during the dry season, and overproducing rice and other produce to sell in local markets in diamond-producing areas after the rainy season. A seminal study by Mutti (1968) examined the prices of basic foodstuffs such as rice, palm oil and ground nuts in these mining areas, demonstrating that they were significantly higher than in other parts of the country. Binns (1981) would later explore this phenomenon further, reporting that, 'Increasingly, demands for foodstuffs in the mining areas have resulted in the growth of a large and varied group of itinerant traders, who earn a living by purchasing surplus crops and transporting them to the mining area markets for sale, often at substantial profit', and that 'These traders, many of whom are women, have developed a vast and highly organised network for the marketing of food crops, and have been greatly assisted by improvements in the transport network and the increased volume of traffic' (p. 185).

The economic importance of agriculture in Sierra Leone has by no means diminished: today, it is the country's largest employer, engaging 80 percent of the population, the majority (an estimated two-thirds) of whom undertake activities at a subsistence level (ADB and OECD 2009). The importance of farming to diggers, particularly during a time of crisis, was a message that consistently surfaced during interviews. The diggers consulted shared intimate details about their lengthy experiences in the agricultural sector. Many also expressed an appreciation for having acquired these skills at a very

[21] Interview, diamond exporter and supporter, Kenema, July 9th, 2016.

young age, which they suggested made transitioning out of diamond mining during the Ebola crisis fairly straightforward. The following interview excerpts capture this:

> When I was a small boy coming up, I used to follow my father to work on the farm, but since I started mining, I have not been doing any farming until the Ebola outbreak. I thank God for my knowledge of farming, for I am seeing improvement. My crops are growing well and are yielding fruits and I have started harvesting some. [But] I didn't just get into farming. I learned how to farm as a small boy with my father, going to his farm with him. I only became a miner in my late teenage years, at which point I stopped farming.[22]

> I used to be a diamond miner but now I am doing rice farming and cocoa gardening. During Ebola, we sat around without doing mining, and we had no money. I was encouraged by my friends to go into farming. I am no stranger to farming. My late father was a farmer and he taught me how to farm before I became a miner.[23]

> I was a diamond miner but now I am a farmer planting swamp rice and cassava…I had a Maraka man that used to support me but during the Ebola crisis, but he went to his home in Gambia. He left me with no food to eat so I went to the bush fetching firewood for sale so that I could have food for my family and me. One day, on my way to the bush, I met a friend who was doing swamp rice farming with the new Nerica variety that is harvested thrice a year. He asked me to stop fetching fire wood and said that he would give me two bushels of the Nerica rice variety which I could plant and harvest thrice a year as long as there was permanent wet land. He said I would be required to pay him back the amount I borrowed from him for my planting after my harvest…As you can see from my hands, I am just from the swamp working. I have paid back the seeds I borrowed long ago and increased the amount used for planting, at the same time as the yield kept increasing. I have come to realize that through the planting of this rice, I will get plenty of money after two or three years.[24]

In many cases, diggers did not have to stray very far to further root themselves in agriculture because, as Pijpers (2014) points out, many already have farms or gardens located next to their mining operations. Their plots, the author explains, enable them to 'find a living' after a day of washing gravel (p. 33). Recent history certainly offers a glimpse of how robust the links between mining and agriculture are in Sierra Leone. These links, explain Maconachie and Binns (2007), remained largely intact even after the war. In war-torn, post-conflict settings, they have provided a much-needed foundation for rejuvenating both household food security and market-oriented food production, and ultimately, the bedrock for development in villages that were burned to the ground by RUF forces during the 1990s and then abandoned for a decade. This was, however, an unsurprising development in localities such as Kono, which, as one digger explained in an interview, '…before this time…was known for diamonds but is now known for agriculture' because 'the soil is very rich and natural for farming and for vegetable gardening'.[25]

The interview excerpt above broaches the second reason for agriculture's appeal during the crisis, namely its ability to simultaneously solve food security problems at the household level. Several diggers reflected on the precarious economic conditions faced during Ebola, the shortage of finance

[22] Interview, former diamond digger, Bumpeh, July 6th, 2016.
[23] Interview, former diamond digger, Bumpeh, July 3rd, 2016.
[24] Interview, former diamond digger, Bumpeh, July 3rd, 2016.
[25] Interview, former diamond digger, Bumpeh, July 3rd, 2016.

and rice pushing most rural inhabitants into survival mode. Each emphasized that agriculture provided a much-needed lifeline at an exceedingly difficult time for their families:

> Hunger is the main cause for people moving from diamond mining in to farming [during Ebola]. This is because the supporters had gone and there was no one to help us get food.[26]

> Once the money required for mining was not available, people moved into agriculture…They grew crops predominantly for food production.[27]

> We live on rice but when it is not available, we can shift or preferences in order to get something in our stomachs. In Koidu, during Ebola, livelihoods were challenged. People went around begging for food. Food scarcity in Koidu was one factor that caused people to retreat to their villages.[28]

At a time when the prices of imported commodities such as rice, salt, and 'Maggi cubes' had sharply risen, diggers were content with pursuing other agricultural options. One former diamond digger explained that many were content with substituting 'diets with much of the local foods like cassava, yam, bush yam, and a variety of wild yam locally called Khoo'.[29] Another echoed much of the same, stating, emphatically, that 'there is plenty cassava in the villages to live on, and yam also is available'.[30] Another alluded to the suite of options available to diggers-turned-farmers, explaining that even when the preferred staple, rice, was in short supply, 'While at the farm, they can harvest bananas and live on them for the day'.[31]

Some interviewees claimed that they were even able to generate enough crops to sell at the market. As was the case in the 1970s, when, as already explained, individuals overproduced to generate surplus food for sale at markets in mining areas, during Ebola, some diggers were also able to exercise trade-offs between productive activities to maximize their livelihood benefits. As one digger explained in an interview:

> During Ebola, I stopped diamond mining to focus my efforts on farming. My farming and gardening activities were concentrated just around Bumpeh town, and I didn't go far off. Whenever I harvested my crops, I would sell some and leave the rest for consumption. I usually sold the harvest at a good price to business people coming from Freetown and other places. The buyers usually bought the crops and carried them to the main highway so that they could be loaded on to *Okadas* [motorcycle taxis] or vehicles going to Freetown.[32]

This leads to the third and final reason for agriculture's appeal, which was the ability of diggers to undertake activities in relative isolation. The mass movement of diggers to their 'villages of origin' spoke to the efforts being undertaken by the government and international agencies to quarantine Sierra Leone's countryside during the crisis, as well as reduced the probability for infection. Many seemed content with having been removed from the chaos:

[26] Interview, former diamond digger, Bumpeh, July 3rd, 2016.
[27] Interview, Section Chief, Bumpeh, July 4th 2016.
[28] Interview, supporter and artisanal diamond mining license holder, Koidu, July 6th 2016.
[29] Interview, former diamond digger, Bumpeh, July 3rd, 2016.
[30] Interview, supporter and artisanal diamond mining license holder, Koidu, July 6th 2016.
[31] Interview, supporter and artisanal diamond mining license holder, Koidu, July 6th 2016.
[32] Interview, former diamond digger, Bumpeh, July 6th, 2016.

> There is no pressure in the villages because there is plenty of food (pineapples, cassava, oranges, banana, cassava, yam, maize). The people there are not worried about pressure.[33]
>
> Most miners went back to their villages and embarked on farming…In the villages, people are free of rumour mongering and there is farm land for crops.[34]

To summarize, many of Sierra Leone's diggers turned to agriculture during the Ebola crisis, when investment in diamond mining diminished considerably. Doing so offered a much-needed buffer against shocks by helping to alleviate concerns about food security at the household level. For most, it proved to be a relatively straightforward move, as agriculture had long featured heavily in their livelihoods portfolios. The move did not, however, generate significant disposable income. As the next section of the paper explains, it was primarily other types of mining, undertaken in remote, isolated locations, that accomplished this.

4.3 Artisanal gold mining: A Viable Income-Earning Alternative?

Sierra Leone has a long and dynamic history of gold mining, summarized most recently by Akiwumi (2014). But most developments in this sector have been heavily overshadowed by events linked to, and the impacts of, the local alluvial diamond mining economy. Although gold was 'officially' discovered in Sierra Leone in 1926 (Cartier and Burge, 2011), the government did little to encourage indigenous operators to extract it until 1946, when it implemented the sector-specific alluvial mining scheme. By this time, however, most gold mining activity in the country was under the control of Lebanese and Syrian traders, a development which, only a few years later, would be largely forgotten about, following the rapid rise of alluvial diamond mining and accompanying shift in economic interests.

At the time of writing, international interest in large-scale gold mining in Sierra Leone could be described as lukewarm at best. The Canadian company, Mano River Resources, had three exploration permits for gold and the British company, Cluff Gold, had interests in the Baomahun deposit in the south of the country. In fact, it is this deposit which is likely to be the location of the country's first modern gold mine (Archer and Reid, 2016). But here, as well as throughout other areas of Southern Sierra Leone, in the centre of the country in localities such as Makeni, and towards the east in diamond-rich Kono District, alluvial gold mining is now widespread and has been for decades.

During Ebola, artisanal gold mining activity increased sharply across Sierra Leone, despite the significant dip in price being paid, locally, for the metal at the time. At one point, it had dropped as low as 30,000 leones per carat, compared to before and after the epidemic, when people were buying at 45,000 leones per carat.[35] Unperturbed by the dangers and risks, middlemen referred to as 'Jullas' and other sponsors and buyers could be found in abundance in gold-producing areas, 'taking advantages of the low price' of gold.[36] But artisanal gold mining was, in the words of one digger, still 'the best alternative' and therefore, the 'main source of livelihood'.[37] From the data generated from interviews, there are very obvious reasons why this was the case and by extension, how, during the epidemic, artisanal gold mining enhanced the resilience of many diamond digging communities in rural Sierra Leone.

[33] Interview, supporter and artisanal diamond mining license holder, Koidu, July 6th 2016.
[34] Interview, former diamond digger, Bumpeh, July 3rd, 2016.
[35] Interview, Ebola survivor, Bumpeh, July 4th 2016.
[36] Interview, diamond mining supporter, Ngaiya, July 7th, 2016.
[37] Interview, Section Chief, Bumpeh, July 4th 2016.

First, even in situations in which the price being paid for gold was quite low, diggers were able to scrape together enough finance to care for their families. Unlike diamonds, which typically take many weeks, if not months, to locate, as one supporter explained, 'you can mine the gold and sell your proceeds to feed your family on the same day'.[38] In the town of Bumpeh, for example, during Ebola, most people involved in diamond mining 'were all a part of the gold trail', a digger confirmed in an interview. He furthermore explained that most 'went because gold can give quicker cash than diamonds' and 'You can get money every day even though it may not be a huge amount'.[39] Another stated upfront why many diggers moved into gold mining, explaining in an interview that 'Farming alone was not able to get me the money to pay the [school] fees'. He reflected further on his own circumstances: 'I went into gold mining because there was a time when I needed money urgently to pay school fees for my children but there was no way to get it therefore I took advantage of the "daily wage" nature of gold returns and went in to gold mining'.[40]

Secondly, people could also carry out artisanal gold mining in isolation, which enabled them to avoid the government officials and police who were enforcing quarantining exercises, and others commissioned to restrict movements of people in rural areas. The 'daily wage' which the digger mentioned was sufficient enticement for many, despite the obvious risks associated with moving alongside and potentially interacting with those who were infected. But with government officials continuing to show little interest in developing and monitoring artisanal gold mining in the country, the latter due in large part to a poor knowledge of the dynamics of the networks behind the metal's distribution following extraction, diggers' movements into the sector went largely undetected. As the same digger clarified, 'Those who mined gold were doing so in hiding'.[41] A supporter offered a more detailed explanation of the clandestine nature of the sector:

> Some went to their villages, others went to gold mining. During the crisis, gold mining accommodated most people because it takes place in the bush while in the case of diamonds you are in contact with people on the road and hence [there is a] high risk of being caught. This is one advantage for gold mining.[42]

Overall, during Ebola, another digger explained, numerous 'people moved into the bushes where they built huts and were busy mining gold', to the point where 'They were permanently resident there'.[43]

This leads to the third, and final, reason, which concerns diggers' relationships with those closest to them, and their reliance on these during times of crisis. Specifically, and as confirmed by most interviewees, participation in artisanal gold mining enabled diggers to retain some semblance of solidarity – though nowhere close to that afforded by diamond mining – through working in small groups and at times, close to their wives and children. In the case of the latter, as Maconachie and Hilson (2011) reported earlier in the decade, in Sierra Leone, artisanal gold mining has long been controlled and populated predominantly by women. This explains why, as one digger explained in an interview, 'If the man has a family to take care of and he has no job, he will prefer to go with the wife in gold mining than to sit alone in the house'.[44] Another digger reflected on his own experience,

[38] Interview, diamond mining supporter, Ngaiya, July 7th, 2016.
[39] Interview, Ebola survivor, Bumpeh, July 4th 2016.
[40] Interview, gold miner, Bumpeh, July 6th 2016.
[41] Interview, gold miner, Bumpeh, July 6th 2016.
[42] Interview, diamond mining supporter, Ngaiya, July 7th, 2016.
[43] Interview, Ebola survivor, Bumpeh, July 4th 2016.
[44] Interview, gold miner, Kai Peya, July 7th, 2016.

grateful that he was able to generate some form of income, in relative isolation out of the reach of the disease, working alongside his family:

> Diamonds are my premium mineral to mine but because they were very difficult to find, I had to leave it and moved over to gold mining. I am an indigene of this place with seven children and hence during the Ebola, I took all my children to a village where we were mining gold in the bush. We were there mining gold throughout the Ebola period until the disease was declared ended when we had to return to our town. I have children in junior secondary school levels two and three, and primary school going pupils in classes two and four…I took them all in to the bush so that they could not contact someone with the disease.[45]

Whilst artisanal gold mining is carried out in much smaller groups, all of the individuals interviewed who had 'branched out' seemed to take solace in being able to work with others during a time of crisis. Typically, explained one digger who worked in, and was effectively confined to, the remote village of Titambaya in Nimikoro Chiefdom, 'Less people – two or three – in a group were allowed to mine gold', whilst 'It was the large groups of five and above that were not allowed to work'.[46]

Artisanal gold mining was clearly a much-needed source of income during the Ebola crisis. But as will be explained, chromite and coltan mining provided an equally-important supplementary source of finance.

4.4 Chromite and Coltan Mining: The New Frontiers?

Having further honed their skills extracting gold, many diggers interviewed exuded confidence in their ability to mine, expressing a desire to foray even further afield on the resource extraction frontier. Some diggers explained that the emerging chromite mining and coltan mining sectors were their preferred destinations during the crisis. In the case of the former, interestingly, the broad consensus was that gold mining, which again, provided immediate economic relief when diamond digging became unviable, was used as a stepping stone to facilitate entry. The following excerpts suggest as much, as well as capture why chromite mining proved to be so popular:

> While this was happening, another mineral called chromite was discovered that is attracting the attention of most miners. Most miners have gone to mine chromite. It is being mined in Nimikoro and in Sandor.[47]

> I was a diamond miner but now I am a chromite miner…I started mining chromite just few months before the Ebola outbreak. When we heard the news of its mode of transmission, I decided to stay in the bush doing my mining. The chromite rush was first at Kongobadu village in Sandor Chiefdom and I was part of it. Now, it was being discovered nearby in the Nimi forest at Kia Peya, meaning we don't have to go too far as before. So now I can mine and farm at the same time. I had no regret going in to chromite mining because it's a newly discovered mineral and therefore its price was high. It was sold at 120,000 leones per butter cup (approx. 1kg). After a couple of months in the bush, I was able to raise some money and came back home to live with my family.[48]

> I was doing gold mining but now I am mining chromite…When I mined gold, I usually got money to take care of family, but I have a friend who told me of another mineral called chromite that

[45] Interview, gold miner, Bumpeh, July 6th, 2016.
[46] Interview, gold miner, Bumpeh, July 6th, 2016.
[47] Interview, Town Speaker, Bumpeh, July 6th, 2016.
[48] Interview, chromite miner, Bumpeh, July 6th, 2016.

> was discovered at Kongobadu which is easier to get. She said I could make money more easily in chromite than in gold…On my own, I proved that there is more money in chromite mining than gold as I can now pay school fees for all my children. Before this time, I was not able to do so for all of them…My husband has no money so I am doing my best from chromite mining to take care of the home. When the day is good in gold I do get sometimes get 100, 000 leones for 2½ carats of gold. In the case of chromite, the best day was 500,000 leones…It is a little more difficult to mine than gold, but much more profitable as well. Where as you can even wash the top soil and get gold, in the case of chromite, you have to trip and get deep down to the gravels in the sub soil which you can wash to get the chromite. [49]

Both gold mining and chromite mining played important roles in helping many individuals cope with a shortage of financial capital assets, in the process building diggers' resilience during a period of chaos. But it seems to have been a case of each playing a different role, specifically, gold initially providing diggers with some stability and subsequently, chromite extraction being pursued, as it was a more lucrative option.

The same can be said about coltan, recently dubbed by the Government of Sierra Leone as 'the new kid on the block' in reference to the growing interest in the commodity in the country and its untapped economic potential (Akiwumi and Hollist, 2015). This was, to some extent, revealed during the Ebola crisis, a time when many diggers enthusiastically flocked to coltan-bearing sections of the country's interior. A local leader recounted the events in an interview:

> The Ebola crisis caused complete cessation of economic activities and when coltan was discovered, it attracted many miners as it brought in instant cash to miners. People didn't migrate to mining coltan directly because of Ebola; rather, it is the easy nature of the work and the ease of getting the money compared to diamond mining that caused the migration. In a day's work, it was easier to get one butter can full of coltan (1kg) which could be sold at 150,000 leones, than a piece of diamond that could be sold at 150,000 leones. The coltan is helping us more than diamond mining in these areas. It has complemented the poor diamond production. Those who used to support diamond mining have all gone.[50]

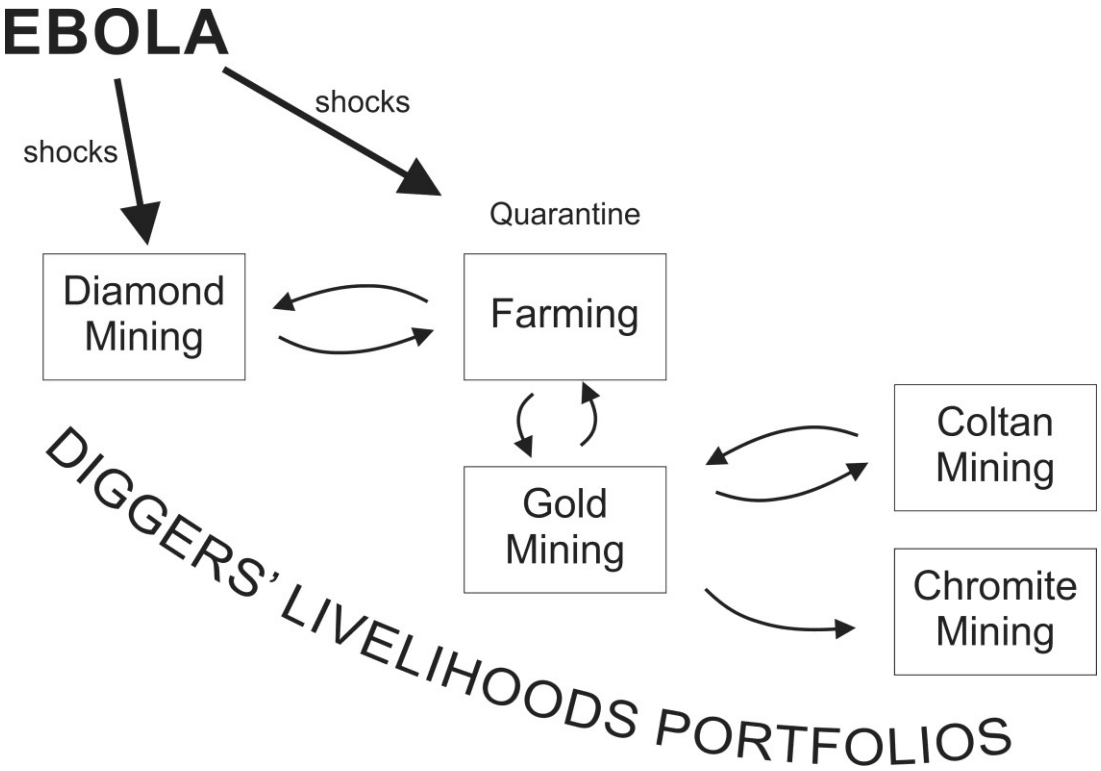
Clearly, coltan helped to sustain livelihoods in remote areas of the country during the Ebola crisis. But despite highlighting the importance of both chromite mining and coltan mining, interviewees failed to detail completely the impacts both activities had during the Ebola crisis in Sierra Leone. If what was shared during interviews is remotely accurate, however, the movement was certainly akin to how, as Warren (2002) explains, 'in some instances, savings generated through wage labor (and in particular by migratory wage labor) can re-capitalize impoverished farms and create new opportunities for independent enterprise development' (p. 8), although the circumstances which fuelled it in this particular case were very unique. Nevertheless, despite the chaos, in branching out into chromite mining and coltan mining, diggers were clearly not averse to maximizing their revenue bases when the opportunity presented itself; nor did they seem overly concerned about potentially being exposed to Ebola through work in the large groups congregating in chromite and coltan-bearing areas.

In summary, evidence generated from interviews carried out in the immediate aftermath of the crisis suggests that Sierra Leone's diamond diggers continue to exhibit great resilience in the face of uncertainty, as they have done for decades. Diggers have long drawn upon the diverse range of capital assets that they 'juggle' within their livelihood portfolios, and are able to seamlessly shift from one activity to another in times of need. Their livelihoods portfolios are consequently fluid and dynamic, and livelihood strategies are susceptible to recalibrate over time and space, as conditions change and

[49] Interview, chromite miner, Bumpeh, July 6th, 2016.
[50] Interview, Town Speaker, Bumpeh, July 6th, 2016.

communities are exposed to new shocks and stresses. New evidence presented here, however, has also demonstrated that the diversified livelihood pathways of diamond diggers in Kono District show a remarkable ability to adapt and respond to new pressures: many have branched out into new economic frontiers such as gold, coltan and chromite extraction, whilst continuing to draw upon on the longstanding linkages of the farming-mining economy (Figure 2).

Figure 2: A glimpse of Sierra Leone's diggers' reconfigured livelihoods portfolios post-Ebola



5. Conclusion

Over the past three years, there has been a steady stream of research undertaken on the Ebola crisis, predominantly focusing on the dynamics of the disease, its transmission, emergency preparedness and the inadequate international response to containing the outbreak. There has, however, been virtually no research conducted on the impacts and responses of rural households to the crisis, or on understanding the livelihood coping strategies that were employed by impacted communities. The analysis presented in this paper helps to fill this gap by sharing findings from research carried out in 2016, shortly after the country was declared 'Ebola free'. It draws inspiration from the literature on resilience to provide new insight into how communities in diamondiferous Kono District responded to the devastating consequences of the crisis. The paper offers a more fine-grained picture of how livelihood diversification was the key to survival for mining households, particularly the diggers found at the base of the country's diamond production pyramid. In the process, a number of important policy lessons are also revealed, as the Government of Sierra Leone continues to revise and reform its artisanal mining policy.

As explained in some detail, previous research on the artisanal mining economy in Sierra Leone has demonstrated that the sector does not merely generate income for poor people; it rather interlocks closely with a host of other downstream and ancillary activities that drive the rural economy. Most

notably, this body of work has explored linkages between the farming and mining sectors. This micro-economy is defined by seasonal migratory labour streams, where individuals straddle different productive activities throughout the year, by moving freely between various geographic locations. In this respect, the Ebola crisis was disastrous for diamond miners. At the height of the crisis, when vast amounts of territory were in effective quarantine and regional trade routes were blocked, the artisanal diamond mining sector came to a virtual standstill, and start-up capital for other economic activities vanished. This not only had significant consequences for diamond diggers, but also for the entire patronage system which supplies financial capital to meet the costs of labour and production. But as revealed in detailed discussions with diggers and supporters, this, in many ways, served as a catalyst for further innovation and 'branching out' into new economic activities in remote locations, such as chromite and coltan extraction in remote off-road villages.

The adaptability and resilience of mining communities in the face of the crisis also potentially illuminates a number of key areas in need of further reflection and debate. Specifically, the gradual post-Ebola realignment of Sierra Leone's diamond mining economy provides an important opportunity to identify and engage with the main constraints associated with the diamond mining sector, and offers a window to reflect upon its interconnections to other areas of the rural economy. Above all, a more nuanced understanding of the interlocking nature of the country's existing mineral supply chains is urgently needed, as is an appreciation of how an evolving policy machinery can play a more effective role in supporting diversified rural livelihood portfolios. Policy dialogues continue to overlook – and at times, downplay – the socioeconomic importance of informal mining activities, and their central place in the rural economy. But perhaps more critically, the government's obsessive focus on diamonds, since their discovery in the 1930s, has meant that important emerging mining developments have not received the support or attention that they require. Although it has long been acknowledged that Kono's richest alluvial diamond deposits are increasingly becoming exhausted, and diversification away from the sector is urgently needed, the Ebola crisis has clearly exposed the fact that there are other significant branches of the mining economy that are worthy of support.

In the immediate aftermath of the crisis, the Ministry of Finance and Economic Development launched its *National Ebola Recovery Strategy*, a plan which was initially designed to be implemented over a 24-month period to reengage the country's primary development roadmap, the *Agenda for Prosperity*. A central pillar of the strategy involved restoring macro-economic growth through the private sector and foreign direct investment, especially in key 'growth pole' sectors such as agriculture, energy, manufacturing, transport and tourism, and mining and construction. Whilst this recovery plan acknowledged the need to ensure the resumption of large-scale mining operations, particularly in light of the void left by the suspension of operations of London Mining, and the financial difficulties faced by African Minerals Limited, it also stressed the need for a 'significant lift in non-mineral economy growth rates' to repair the damage done to the country's socio-economic fabric and make it more attractive to foreign investment. Although 'promoting resilient recovery' was mentioned a number of times throughout the strategy, there was little commitment to supporting artisanal mining activities, the very sector which strengthened resilience in many people's livelihood portfolios during the worst part of the crisis. Ironically, there was also no recognition of the strong interlocking nature of the farming and mining economies, and the need to develop flexible policies which allow rural residents to straddle both activities throughout the year.

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